LAUSD UNIFIED Division of Adult and Career Education

Career Technical Education (CTE) Course Outline

Course Title:	Auto Tech: Smog Check Inspector Training Level 1
Course Number:	79-90-65
Date:	July 2024
Industry Sector:	Transportation
Pathway:	Systems Diagnostics and Service
CBEDS Title:	Automotive Specialty, Other Combinations
CBEDS Code:	5688
Credits:	5

Hours:

Total
80

Course Description:

This competency-based course is the first in a sequence of two designed to meet the Bureau of Automotive Regulation (BAR) smog licensing requirements for the Basic Clean Air Car Course Program. It provides students with technical instruction and practical experience in engine and emission control training using sustainable and green vehicle technologies. Instruction includes an introduction, safety, resource management, trade mathematics, tools and equipment, service manuals and computer-based information systems, engine theory, design and operation (gasoline/diesel), cooling system, exhaust system, electrical, ignition systems, induction system, fuel injection, carburetion, emission controls, theory, design, and operation, OBD II system history, testing, diagnostics, malfunction, indicator light, strategies and diagnostic trouble codes, main monitors and readiness tests, and employability skills and resume preparation. The competencies in this course are aligned with the California High School Academic Content Standards and the California Career Technical Education Model Curriculum Standards.

Prerequisites:	Enrollment requires successful completion of the Auto Tech: Engine Performance/1 (79-90-68) course or one year experience in the automotive engine performance area.
NOTE:	For Perkins purposes, this course has been designated as an **introductory/concentrator** course. This course meets the Bureau of Automotive Regulation (BAR) standards for the basic clean air car course to become licensed as a smog inspection technician. A minimum of 68 hours of attendance must be completed by students receiving a state required course certificate. This course **cannot** be repeated once a student has received a Certificate of Completion.
A-G Approval	N/A
Methods of Instruction:	Lecture and discussion, demonstration using vehicles of early and late model years, multi-sensory presentation, lab and shop work using early and late model year vehicles.
Student Evaluation:	Summative: End of section assessments.
Industry Certification:	N/A
Recommended Texts:	Baldwin, Brandon, Johanson, Chris. Auto Engine Performance, 6th Edition, Goodheart-Willcox Publishing, 2021 Bureau of Automotive Repair. Smog Check Manual: Basic Clean Air Car Course Workbook. Bureau of Automotive Repair, 2008 Electude. E-Learning Platform LV Classroom MLR eBook, Electude, 2024 Flannery, Tim and Terrin, Bryan. Level 1 & BAR Specified Training Resources, Automotive Training Group, 2018

Link to Resource Folder	https://bit.ly/autotechsmog1

Approved by: Renny L. Neyra, Executive Director

COMPETENCY AREAS AND STATEMENTS	MINIMAL COMPETENCIES	STANDARDS
A. INTRODUCTION Understand, apply, and evaluate classroom and workplace policies and procedures. (2 hours)	1. Discuss the scope and purpose of the course. 2. Discuss the classroom policies and procedures. 3. Discuss and demonstrate Zoom, Schoology, and basic computer skills. 4. Assess students' basic knowledge in engine and emissions principles. 5. Discuss, identify, research, and draw conclusions on the different career paths, occupations, employment outlook, and career advancements in the transportation industry sector which have an impact on engine and emissions. 6. Discuss the opportunities available for promoting gender equity and the representation of non-traditional populations in the automotive industry. 7. Explain and recognize the importance of ethics, teamwork, respecting individual and cultural differences and diversity in the workplace. 8. Describe the role of the Automotive Service of Excellence (ASE) as it applies to the automotive industry. 9. Describe the role of the Automotive Service Education Foundation (ASEF) in auto technician training. 10. Describe the role of the smog check inspector. 11. Discuss and demonstrate how reducing carbon emissions supports the use of green technology.	**Career Ready Practice:** 1, 2, 3, 4, 5, 8, 9, 10, 11, 12 **CTE Anchor:** Academics: 1.0 Communications: 2.1, 2.3, 2.5 Career Planning & Management: 3.1, 3.4, 3.5, 3.6, 3.9 Technology: 4.1, 4.5 Problem Solving & Critical Thinking: 5.4 Ethics & Legal Responsibilities: 8.2, 8.3, 8.4, 8.5 Leadership & Teamwork: 9.3, 9.4, 9.6 Demonstration & Application: 11.1 **CTE Pathway:** C1.1, C1.3
B. SAFETY - GENERAL Understand safety procedures and	1. Discuss classroom and workplace procedures for first aid, emergencies, and accidents/injury prevention. 2. Discuss the California Occupational Safety and Health Administration (Cal/OSHA) workplace	**Career Ready Practice:** 1, 2, 4, 10, 12

techniques in the auto repair and maintenance sector. (4 hours)	requirements for auto technicians to maintain a safe and healthy working environment. 3. Discuss the impact of Environmental Protection Agency (EPA) legislation on Transportation Industry Sector practices in protecting and preserving the environment. 4. Describe and demonstrate ASEF standards regarding proper handling, storage and disposal of chemicals and materials used in an auto shop. 5. Discuss the impact of California Air Resources Board (ARB) legislation on the Transportation Industry Sector. 6. Explain how environmental, economic, and automotive emissions impact green technology. 7. Discuss the Bureau of Automotive Repair (BAR) standards for consumer and environmental protection. 8. Discuss the use of the Safety Data Sheet (SDS) as it applies to the automotive industry. 9. Discuss the safety items required by the federal, state, and local regulations. 10. Discuss the importance of proper personal hygiene in the classroom and auto shop. 11. Describe and demonstrate the standards regarding proper use of protective equipment in an auto shop: a. clothing and gloves b. respiratory gear c. eye gear d. work shoes e. ventilation impacting health for hazard and exposure to emissions/exhaust gas f. handling, storage, and disposal of chemicals and hazardous materials used in an auto shop g. proper use of tools and equipment 12. Practice personal safety when lifting, bending, or moving equipment and supplies. 13. Explain the importance of practicing safe, legal, and response use of digital media information. 14. Pass the safety test with 100% accuracy.	**CTE Anchor:** Academics: 1.0 Communications: 2.1, 2.3, 2.5, 2.6 Technology: 4.1, 4.2 Health & Safety: 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7 Technical Knowledge & Skills: 10.2, 10.4 Demonstration & Application: 11.1 **CTE Pathway:** C1.1, C1.2, C1.3, C1.4, C2.2 , C2.3, C4.1, C4.2
C. RESOURCE MANAGEMENT Understand, apply, and evaluate the resource	1. Define, describe, and research the benefits of the following to include identifying barriers for appropriate communication: a. resources b. management c. sustainability	**Career Ready Practice:** 1, 2, 4, 7, 8, 11

management principles and techniques in the auto repair and maintenance field. (1 hour)	d. profitability e. company growth 2. Describe and list specific examples of the effective management of the following resources in the auto shop repair and maintenance business: a. time b. materials c. personnel d. ethical business practices e. customer relations practices 3. Pass a resource management assessment with an 80% score or higher.	**CTE Anchor:** Academics: 1.0 Communications: 2.1, 2.2, 2.3, 2.5 Technology: 4.1, 4.2, 4.5 Responsibility & Flexibility: 7.1, 7.6, 7.7 Ethics & Legal Responsibilities: 8.1, 8.3 Technical Knowledge & Skills: 10.1 **CTE Pathway:** C4.3, C5.3, C5.5, C5.6
D. TRADE MATHEMATICS Understand, apply, and evaluate the mathematical requirements used in auto diagnosis, maintenance, and the repair field.	1. Define, research, and identify the practical math terminology to include OHMs law and PASCAL law in the auto repair and maintenance field. 2. Describe, demonstrate, and ask questions regarding problem-solving techniques involving: a. basic trade mathematical operations b. changing fractions to decimals c. changing decimals to fractions d. engineering notation 3. Describe, demonstrate, interpret, and form teams by using the English and metric units of the measuring system and draw conclusions to make informed decisions. 4. Describe, demonstrate, and compare problem-solving techniques for: a. algebraic problems b. percentages c. reading and interpreting graphs d. calculator e. geometric problems that apply to auto repair and maintenance such as angles and degrees	**Career Ready Practice:** 1, 2, 4, 5, 9, 10, 11 **CTE Anchor:** Academics: 1.0 Communications: 2.1, 2.3, 2.5 Technology: 4.1, 4.2, 4.3 Problem Solving & Critical Thinking: 5,1, 5.2, 5.3, 5.4 Leadership & Teamwork: 9.3, 9.7 Technical Knowledge & Skills:

(2 hours)	5. Pass a trade mathematics assessment with an 80% score or higher.	10.1 Demonstration & Application: 11.1 **CTE Pathway:** C2.4, C2.5, C2.6, C2.7, C4.3
E. TOOLS AND EQUIPMENT Understand, apply, and evaluate the policies and procedures for using brake diagnostic, maintenance, and repair tools and equipment.	1. Define, discuss, research, analyze, demonstrate, and form teams to select the proper use, maintenance, and storage techniques for the following specialty tools and equipment for engine and emissions to make informed decisions: a. advance timing light b. hand vacuum pump c. engine compression tester d. fuel pressure gauge e. tachometer/dwell meter f. propane enrichment kit g. graphing multimeter h. high impedance digital volt/ohm meter i. ammeter capable of measuring amps and milliamps j. hand tools k. scan tools l. diagnostic and repair tools m. ignition analyzer/oscilloscope n. device capable of accessing BAR website (PC) o. tire pressure gauge p. vacuum gauge q. engine analyzer r. digital storage oscilloscope s. torque wrench t. fender covers u. EVAP Smoke Machine (with Nitrogen Gas) v. Emission Control Application Guide w. exhaust analyzer 2. Explain, demonstrate, and ask significant questions pertaining to the following: a. selection of the appropriate hand, power tools, and equipment for each job b. procedure for checking out hand, power tools, and equipment from the tool room	**Career Ready Practice:** 1, 2, 4, 5, 9, 10, 11 **CTE Anchor:** Academics: 1.0 Communications: 2.1, 2.3, 2.5 Technology: 4.1, 4.2, 4.3 Problem Solving & Critical Thinking: 5.1, 5.4 Health & Safety: 6.3, 6.4 Leadership & Teamwork: 9.3, 9.7 Technical Knowledge & Skills: 10.1 Demonstration & Application: 11.1 **CTE Pathway:** C2.2, C2.3, C2.4, C2.5, C2.6, C2.7, C6.4

(5 hours)	c. safe use of the most common hand, power tools and equipment in the auto shop d. practice personal safety when lifting, bending, or moving equipment and supplies 3. Pass a tools and equipment assessment with an 80% score or higher.	
F. SERVICE MANUALS AND COMPUTER-BASED INFORMATION SYSTEMS Understand, apply, and evaluate the contents of service manuals and computer-based information systems as important sources of reference to an auto technician. (2 hours)	1. Form teams to identify the different types of service manuals. 2. State the different types of information that can be found in service manuals such as specifications, troubleshooting charts, and repair information. 3. Describe and demonstrate the use of service manuals. 4. Describe, demonstrate, and analyze the use of web-based search engines in finding automotive technical information to make informed decisions. 5. Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction. 6. Explain the importance of documenting the customer's vehicle for bumper damage, and/or taking pictures of vehicle, mileage, and any visible leaks prior to working on the vehicle. 7. Pass a service manual and computer-based information system assessment with an 80% score or higher.	**Career Ready Practice:** 1, 2, 4, 5, 9, 10, 11 **CTE Anchor:** Academics: 1.0 Communications: 2.1, 2.3, 2.5 Technology: 4.1, 4.2, 4.3 Problem Solving & Critical Thinking: 5.1, 5.2, 5.3, 5.4 Leadership & Teamwork: 9.3, 9.7 Demonstration & Application: 11.1 **CTE Pathway:** C2.6, C4.3, C4.4
G. ENGINE THEORY, DESIGN AND OPERATION (GASOLINE/DIESEL) Understand and evaluate operational techniques of the Internal Combustion Engine (ICE).	1. Form teams to define, identify, discuss, research, and synthesize to gather information to make informed decisions for the major chemical components of smog: a. NOx (Oxides and Nitrogen) b. HC (Hydrocarbons) c. CO (Carbon Monoxide) 2. Demonstrate knowledge of the four-stroke engine. 3. Evaluate the advantages and disadvantages of spark ignited combustion.	**Career Ready Practice:** 1, 2, 4, 5, 9, 10, 11, 12 **CTE Anchor:** Academics: 1.0 Communications: 2.1, 2.3, 2.5

(5 Hours)	4. Demonstrate knowledge of how poor engine condition can affect emissions output per rules and regulations. 5. Demonstrate and identify and locate primary engine systems and components. 6. Form teams to recognize abnormal engine noises and/or vibrations that would cause a safety risk. 7. Demonstrate, inspect, and assess condition of drive belts, pulleys, and tensioners. 8. Perform necessary procedures to maintain, diagnose, service, and repair vehicle systems and malfunctions. 9. Pass engine theory, design, and operation assessment with an 80% score or higher.	Technology: 4.1, 4.2, 4.3, 4.5, 4.6 Problem Solving & Critical Thinking: 5.1, 5.2, 5.3, 5.4 Leadership & Teamwork: 9.3, 9.7 Technical Knowledge & Skills: 10.1, 10.2 Demonstration & Application: 11.1 **CTE Pathway:** C1.1, C1.3, C1.5, C3.1, C3.7, C5.6, C6.1, C6.2, C6.3, C6.4
H. COOLING SYSTEM Describe the basic understanding and knowledge of the cooling system.	1. Describe basic knowledge of the cooling system design and operation as applicable to safety and understanding normal operating temperature and how it impacts green emissions. 2. Discuss the manufacturer's maintenance procedures and practices regarding a poorly performing cooling system affecting emissions output. 3. Demonstrate and use appropriate tools and equipment to diagnose, service, repair, and maintain systems and components. 4. Form teams to demonstrate, identify, and: a. locate cooling system components b. check for proper coolant level c. research coolant type and proper system pressure using the standard and metric system to make informed decisions d. recognize the importance of calibration processes, systems, and techniques using various measurement and testing devices e. practice the safe handling and storage of chemicals and hazardous waste and its effects on the environment	**Career Ready Practice:** 1, 2, 4, 5, 9, 10, 11, 12 **CTE Anchor:** Academics: 1.0 Communications: 2.1, 2.3, 2.5 Technology: 4.1, 4.5 Problem Solving & Critical Thinking: 5.1, 5.2, 5.3, 5.4 Health & Safety: 6.5, 6.6 Leadership & Teamwork: 9.3, 9.7

(2 hours)	5. Demonstrate and check and identify proper engine operating temperature and leaks. 6. Pass a cooling system assessment with an 80% score or higher.	Demonstration & Application: 11.1 **CTE Pathway:** C1.1, C1.2, C1.3, C2.1, C2.2, C2.3, C2.4, C2.7, C4.1, C6.2
I. EXHAUST SYSTEM Identify the basic knowledge and understanding of the exhaust components. (1 hour)	1. Demonstrate how to use reference materials to define an exhaust system. 2. Identify exhaust system components allowing room to ask questions when distinguishing between single and dual exhaust systems. 3. Recognize and interpret information regarding abnormal exhaust smoke and how various components interact with each other. 4. Explain how waste gasses, emissions, and other environmentally destructive substances affect the environment. 5. Evaluate the advantages and disadvantages of existing, new, and emerging systems and the effects of those systems on the environment. 6. Recognize the importance of calibration processes, systems, and techniques using various measurement and testing devices. 7. Pass an exhaust system assessment with an 80% score or higher.	**Career Ready Practice:** 1, 2, 4, 5, 10, 12 **CTE Anchor:** Academics: 1.0 Communications: 2.1, 2.3, 2.5 Technology: 4.1, 4.2 Problem Solving & Critical Thinking: 5.1, 5.3, 5.4 Technical Knowledge & Skills: 10.1 Demonstration & Application: 11.1 **CTE Pathway:** C1.3, C1.5, C2.1, C2.6
J. ELECTRICAL Understand and apply electrical principles to auto repair and maintenance.	1. Define, explain, and demonstrate practical application on OHMs law and identify any barriers. 2. Form teams to identify and ask significant questions that clarify various points of view when solving OHM's law equations to make informed decisions.	**Career Ready Practice:** 1, 2, 4, 5, 9, 10, 11 **CTE Anchor:** Academics: 1.0

(18 hours)	3. Use appropriate personal protective equipment (such as safety glasses, proper ventilation) and safety practices. 4. Describe and demonstrate knowledge of basic electrical principles to the extent necessary to conduct smog check functional tests, including EGR (battery polarity, shorts, opens, grounds, etc.) using manufacturers procedures. 5. Demonstrate and research the use of electrical wiring diagrams by using reference materials. 6. Use electrical components locator such as OBD II DLC, EGR solenoid. 7. Demonstrate the proper use of a digital multimeter as applicable to EGR functional testing or other smog check related testing. 8. Pass an electrical assessment with an 80% score or higher.	Communications: 2.1, 2.2, 2.3, 2.5 Technology: 4.1, 4.2 Problem Solving & Critical Thinking: 5.1, 5.2, 5.3, 5.4 Health & Safety: 6.6 Leadership & Teamwork: 9.3, 9.7 Technical Knowledge & Skills: 10.1 Demonstration & Application: 11.1 **CTE Pathway:** C1.4, C2.2, C2.3, C2.4, C2.6, C2.7, C4.1, C4.3, C7.1, C7.2, C7.7
K. IGNITION SYSTEM Understand and diagnose the ignition system operation.	1. Define and demonstrate knowledge of ignition systems theory, design, and operation and how it impacts green technology. 2. Form teams to identify and locate ignition system types and components (primary and secondary ignition) and how they interact with each other. 3. Identify and ask significant questions that clarify various points of view to make informed decisions on how the ignition system affects the emission system. 4. Describe and demonstrate knowledge of how a malfunctioning ignition system can increase emissions output. 5. Demonstrate and check ignition timing, and verify proper setting on various vehicle designs using appropriate tools while following manufacturers procedures. This includes the ability to use reference sources to determine proper timing	**Career Ready Practice:** 1, 2, 4, 5, 9, 10, 12 **CTE Anchor:** Academics: 1.0 Communications: 2.1, 2.3, 2.5 Technology: 4.1, 4.2, 4.5 Problem Solving & Critical Thinking: 5.1, 5.3, 5.4

(2 hours)	check procedures (under-hood ECS label, emission control application guides, and service/repair manuals). 6. Research past, present, and projected technological advances. 7. Pass an ignition systems assessment with an 80% score or higher.	Leadership & Teamwork: 9.3, 9.7 Technical Knowledge & Skills: 10.1 Demonstration & Application: 11.1 **CTE Pathway:** C1.1, C2.2,C2.3, C2.6, C4.1, C4.3, C6.4
L. INDUCTION SYSTEM Understand the function of the air induction system.	1. Define, identify, and locate air induction and air cleaner assemblies and components. 2. Form teams to identify, locate, and demonstrate the intake manifold to make informed decisions. 3. Describe and locate positive pressure induction systems (turbo charger, super charger, and components). 4. Demonstrate, describe, and measure manifold pressure as related to smog check function tests to repair emission related problems. 5. Explain and use electronic technical reports and manuals to research how induction systems are used to support green technology by improving energy efficiency and reducing environmental impact. 6. Pass an induction system assessment with an 80% score or higher.	**Career Ready Practice:** 1, 2, 4, 5, 9, 10, 11, 12 **CTE Anchor:** Academics: 1.0 Communications: 2.1, 2.3, 2.5 Technology: 4.2, 4.3, 4.5 Problem Solving & Critical Thinking: 5.1, 5.4 Leadership & Teamwork: 9.3, 9.7 Technical Knowledge & Skills: 10.1 Demonstration & Application: 11.1 **CTE Pathway:**

(1 hour)		C1.3, C1.5, C2.2, C2.6, C4.3
M. FUEL INJECTION Understand and diagnose the function of the fuel injection system. (2 hours)	1. Describe and define basic knowledge of fuel injection systems theory, design, and operation. 2. Describe and ask questions regarding how a malfunctioning fuel injection system can affect emissions output, as related to smog check results. 3. Identify and locate fuel injection system types and components on various vehicle designs (continuous injection system (CIS), throttle body injection (TBI), port, Direct, other). 4. Form teams to identify and locate diesel fuel systems components and make informed decisions. 5. Form teams to research and demonstrate the proper method of checking fuel pressure and volume. 6. Explain how fuel injection is used to support green technology by improving energy efficiency and reducing environmental impact 7. Pass a fuel injection assessment with an 80% score or higher.	**Career Ready Practice:** 1, 2, 4, 5, 9, 10, 11, 12 **CTE Anchor:** Academics: 1.0 Communications: 2.1, 2.3, 2.5 Technology: 4.1, 4.2, 4.5 Problem Solving & Critical Thinking: 5.1, 5.3, 5.4 Leadership & Teamwork: 9.3, 9.7 Technical Knowledge & Skills: 10.1 Demonstration & Application: 11.1 **CTE Pathway:** C1.3, C1.5, C2.6, C4.3
N. CARBURETION Demonstrate basic knowledge of the carburetion system.	1. Define and demonstrate basic knowledge of carburetion theory, design, tools, operation, and feedback operation. 2. Demonstrate and use reference materials to understand the basic knowledge regarding how a malfunctioning carburetor can affect emissions output, as related to smog check emissions results impacting common environmental conservation practices. 3. Identify components of a carburetor, including any difficulty associated with carburetion (early fuel evaporative, anti “dieseling” controls, deceleration	**Career Ready Practice:** 1, 2, 4, 5, 10 **CTE Anchor:** Academics: 1.0 Communications: 2.1, 2.3, 2.5 Technology:

(1 hour)	controls, etc.) within the context of a smog check visual inspection. 4. Check for proper engine idle speed, per manufacturer's specification. 5. Pass a carburetion assessment with an 80% score or higher.	4.1, 4.2 Problem Solving & Critical Thinking: 5.1, 5.3 Technical Knowledge & Skills: 10.1 Demonstration & Application: 11.1 **CTE Pathway:** C1.3, C2.1, C2.2, C2.3, C3.7, C4.2, C6.3
O. EMISSION CONTROLS, THEORY, DESIGN, AND OPERATION Understand and evaluate emission control components.	1. Define and demonstrate basic knowledge of theory, design, operation, and comparisons of the following emission control systems: a. Crankcase Ventilation (PCV) b. Evaporative (EVAP) c. Exhaust Gas Recirculation (EGR) d. Thermostatic Air Cleaner (TAC) e. Air Injection (AIS) f. Ignition Spark Control (SPK) g. Catalytic Converter (CAT) h. Diesel Oxidation Catalyst (DOC) i. Periodic Trap Oxidizer (PTOX) j. Diesel Particulate Trap or Filter (DPF) k. Diesel Selective Catalyst Reduction (SCR) l. hybrid automotive emissions 2. Identify, research using reference materials, and locate the following emission control systems in their entirety: a. PCV b. EVAP c. EGR d. TAC e. AIS f. SPK g. CAT h. DOC i. PTOX j. DPF k. SCR	**Career Ready Practice:** 1, 2, 4, 5, 9, 10, 11, 12 **CTE Anchor:** Academics: 1.0 Communications: 2.1, 2.3, 2.5 Technology: 4.1, 4.2 Problem Solving & Critical Thinking: 5.1, 5.3, 5.4 Leadership & Teamwork: 9.3, 9.7 Technical Knowledge & Skills: 10.1 Demonstration & Application: 11.1 **CTE Pathway:**

(12 hours)	3. Form teams to demonstrate and check EGR system operation for vehicles in which the smog check EGR functional test applies (traditional, back pressure, computer controlled). 4. Form teams to demonstrate and describe definitions, causes and effects by asking questions to identify solutions for the following emissions: a. Carbon Monoxide (CO) b. Hydrocarbon (HC) c. Nitrogen (NOx) d. Carbon Dioxide (CO2) e. Oxygen (O2) 5. Pass an emission controls theory, design, and operation assessment with an 80% score or higher.	C1.1, C1.3, C1.5, C2.3, C2.6, C3.7, C4.3, C6.3, C6.4
P. OBD II SYSTEM HISTORY, TESTING AND DIAGNOSTICS Understand the history and development of the OBD II system, apply and evaluate its testing and diagnostic techniques.	1. Describe the history of OBD II development and why the new system was adopted. 2. Use reference materials to describe the federal and California Air Resources Board (CARB) standardization regulations including: a. common terminology b. generic Scan Tool operation c. interface protocols d. service information availability e. bi-directional communication f. reduction of emissions in support of green technology 3. Define common OBD II terminology. 4. Describe the differences between OBD I and OBD II systems, and ask questions that clarify various points in the listed terms: a. Scan Tool Operation b. EEPROM updates c. diagnostic connector characteristics d. trouble code strategies e. diagnostic routines f. main monitors g. readiness tests 5. Describe and demonstrate the following: a. computer relearn b. Throttle Position Sensor (TPS) relearn c. Idle Air Control (IAC) relearn d. fuel trim relearn e. misfire relearn	**Career Ready Practice:** 1, 2, 4, 5, 9, 10, 11, 12 **CTE Anchor:** Academics: 1.0 Communications: 2.1, 2.3, 2.5 Technology: 4.1, 4.2, 4.3 Problem Solving & Critical Thinking: 5.1, 5.2, 5.3, 5.4 Leadership & Teamwork: 9.3, 9.7 Technical Knowledge & Skills: 10.1 Demonstration & Application: 11.1 **CTE Pathway:**

(5 Hours)	6. Describe and demonstrate the concept of main monitors to solve predictable and unpredictable work-related problems using various types of reasoning as appropriate. 7. Form teams to describe and demonstrate the concept of "Rationality" and the importance of analyzing Scan Tool Data to identify the root cause of a problem to make informed decisions. 8. Demonstrate, research, and identify engine management system components, actuators, sensors, and switches with the context of the Smog Check visual inspection. 9. Pass an OBD II System History, Testing and Diagnostics assessment with an 80% score or higher.	C1.1, C1.3, C1.5, C2.2, C2.3, C2.6, C4.3, C6.3, C6.4
Q. OBD II MALFUNCTION INDICATOR LIGHT (MIL) STRATEGIES AND DIAGNOSTIC TROUBLE CODES Understand, apply, and evaluate the OBD II MIL strategies and diagnostic trouble codes.	1. Describe the On-Board specialty program (program manager, diagnostic executive, task manager, etc.) and its use of "Rationality" to determine if systems are functioning within acceptable limits. 2. Differentiate between the OBD I "Check Engine Light" and the "OBD II MIL" operation. 3. Form teams to describe, research, and demonstrate strategies to activate and deactivate an MIL (i.e., using a Scan Tool to clear codes, having computer clear codes). 4. Explain, identify, and demonstrate current pending and history codes on the Scan Tool. 5. Define, describe, and demonstrate the Freezer Frame Data and its use in diagnosis. 6. Describe the lack of "Intermittent" codes on OBD II. 7. Describe and demonstrate the following modes of the MIL operation: a. MIL OFF b. MIL ON c. MIL flashing conditions d. Enhanced Diagnostic Faults 8. Use reference materials to describe the SAE J2012 Standards for code numbering and consistency of the code name. 9. Differentiate between type "A" and type "B" codes. 10. Describe the OBD II diagnostic flow chart. 11. Describe verification tests and proper reset procedures used after all repairs. 12. Demonstrate basic knowledge of engine management systems and on-board diagnostic theory, design, and operation to solve predictable	**Career Ready Practice:** 1, 2, 4, 5, 9, 10, 11, 12 **CTE Anchor:** Academics: 1.0 Communications: 2.1, 2.3, 2.5 Technology: 4.1, 4.2, 4.3 Problem Solving & Critical Thinking: 5.1, 5.2, 5.3, 5.4 Leadership & Teamwork: 9.3, 9.7 Technical Knowledge & Skills: 10.1 Demonstration & Application: 11.1 **CTE Pathway:**

(5 Hours)	and unpredictable work-related problems and make informed decisions. 13. Demonstrate and check for proper OBD II communication. 14. Locate, demonstrate, and connect Scan Tool to diagnostic link connector (DLC) on various vehicle applications. 15. Describe and demonstrate the use of the Scan Tool graphing data menu and troubleshooting circuits with a lab scope. 16. Explain how OBD II systems can be used to detect and diagnose issues that affect a vehicle's emissions and fuel efficiency, helping to reduce harmful pollutants and improve overall environmental impact supporting green technology. 17. Pass an OBD II Malfunction Indicator Light (Mil) Strategies and Diagnostic Trouble Codes assessment with an 80% score or higher.	C1.1, C1.3, C1.5, C2.2, C2.3, C2.6, C4.3, C6.3, C6.4
R. OBD II MAIN MONITORS AND READINESS TESTS Understand, apply, and evaluate the operational and test techniques for the OBD II Main Monitors to detect failures in the vehicle emission system.	1. Explain and research the Comprehensive Component Monitor code enables conditions. 2. Define and describe the Catalyst Efficiency Monitor and DTC P0420. 3. Describe the Readiness Test and Trip required for testing a Catalyst Monitor. 4. Describe and demonstrate the EGR monitor and the different ways the monitor can test to determine if the EGR is working. 5. Describe various examples of EGR Trips and the EGR Readiness Test. 6. Describe the EVAP Monitor and Readiness Test. 7. Describe and demonstrate the importance of using a pressure tester to find EVAP problems. 8. Describe the importance of a warm-up cycle for some manufacturers. 9. Explain the differences between systems with normally open and normally closed EVAP vent solenoids. 10. Describe and demonstrate the Fuel System Monitor including the Short-Term and the Long-Term Fuel Trim. 11. Describe and demonstrate the feedback process and the effect of adaptive fuel on the long-term Fuel Trim diagnosis. 12. Describe and demonstrate the need to reset the Fuel Trim monitor after all repairs on selected systems.	**Career Ready Practice:** 1, 2, 4, 5, 9, 10, 11, 12 **CTE Anchor:** Academics: 1.0 Communications: 2.1, 2.3, 2.5 Technology: 4.1, 4.2, 4.3 Problem Solving & Critical Thinking: 5.1, 5.2, 5.3, 5.4 Leadership & Teamwork: 9.3, 9.7 Technical Knowledge & Skills: 10.1 Demonstration & Application: 11.1

(5 Hours)	13. Describe H2O switching codes. 14. Describe and demonstrate the effect of a slow H2O on the engine management system. 15. Describe misfire detection. 16. Identify and demonstrate rough road misfire strategies. 17. Describe the importance of monitoring a catalytic converter with a lab scope by comparing the front and rear oxygen sensors. 18. Describe the importance of driving a vehicle within 10% of the values on the Freeze Frame (similar condition strategies). 19. Describe and demonstrate the H2Os Heater Monitor and explain the different methods of determining if the H2Os Heater is working to make informed decisions. 20. Describe the importance of the H2Os Heater for closed loop and for idle control. 21. Describe the Secondary AIR System Monitor, the readiness test and trip for the AIR system. 22. Form teams to demonstrate the completion of an OBD II Trip (for an individual monitor) and the OBD II Drive Cycle on the dyno. 23. Use reference materials to describe the "load" and the horsepower requirements to complete the Readiness Test. 24. Demonstrate knowledge OBD II monitor enabling criteria, including drive cycle routines. 25. Demonstrate and use a Scan Tool check OBD II monitors status. 26. Demonstrate and discuss how OBD II monitor strategy can affect emissions and green technology. 27. Pass an OBD II Main Monitors And Readiness Tests assessment with an 80% score or higher.	**CTE Pathway:** C1.1, C1.3, C1.5, C2.2, C2.3, C2.6, C4.3, C6.3, C6.4
S. EMPLOYABILITY SKILLS AND RESUME PREPARATION Understand, apply, and evaluate the employability skills and resume preparation desired of automotive technicians.	1. Understand and define employer requirements for soft skills such as: a. attitude toward work b. communication and collaboration c. critical thinking, problem solving, and decision-making d. customer service e. diversity in the workplace f. flexibility and adaptability g. interpersonal skills	**Career Ready Practice:** 1, 2, 3, 4, 5, 7, 8, 9, 10, 11 **CTE Anchor:** Academics: 1.0 Communications: 2.1, 2.3, 2.4. 2.5

(3 hours)	h. leadership and responsibility i. punctuality and attendance j. quality of work k. respect, cultural and diversity differences l. teamwork m. time management n. trust and ethical behavior o. work ethic 2. Develop a career plan that reflects career interests, pathways, and post-secondary options. 3. Create/revise a resume, cover letter and/or portfolio. 4. Demonstrate, analyze, research, and review the role of online job searching platforms and career websites to make informed decisions. 5. Understand the importance of assessing social media account content for professionalism. 6. Demonstrate and complete and/or review an on-line job application. 7. Understand and demonstrate interview skills to get the job: a. do's and don'ts for job interviews b. how to dress for the job 8. Demonstrate and create sample follow-up letters. 9. Understand the importance of the continuous upgrading of job skills as it relates to: a. certification, licensure, and/or renewal b. professional organizations/events industry associations and/or organized labor	Career Planning & Management: 3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.8, 3.9 Technology: 4.1, 4.2, 4.3, 4.5 Problem Solving & Critical Thinking: 5.1, 5.4 Responsibility & Flexibility: 7.2, 7.3, 7.4, 7.7 Ethics & Legal Responsibilities: 8.3, 8.4, 8.5 Leadership & Teamwork: 9.1, 9.2, 9.3, 9.4, 9.6, 9.7 Technical Knowledge & Skills: 10.1, 10.3 Demonstration & Application: 11.1, 11.2, 11.5 **CTE Pathway:** C5.4, C5.5
T. FINAL EXAMINATION Understand hands-on competencies and pass a mandatory written exam.	1. Pass a mandatory written examination with a 70% score or higher.	**Career Ready Practice:** 1, 2, 4, 5, 8, 9 **CTE Anchor:** Academics: 1.0

(2 hours)		Communications: 2.1, 2.3, 2.5 Technology: 4.1, 4.2 Problem Solving & Critical Thinking: 5.1, 5.2, 5.3, 5.4 Ethics and Legal Responsibilities: 8.2, 8.3, 8.4, 8.7 Leadership and Teamwork: 9.7 Technical Knowledge & Skills: 10.2 **CTE Pathway:** C5.1

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